

## PATENT COOPERATION TREATY

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## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 2003P07081WO	<b>FOR FURTHER ACTION</b>	
See Form PCT/IPEA/416		
International application No. PCT/GB2004/001876	International filing date (day/month/year) 30.04.2004	Priority date (day/month/year) 16.05.2003
International Patent Classification (IPC) or national classification and IPC H04L12/18		
Applicant SIEMENS AKTIENGESELLSCHAFT et al.		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <ul style="list-style-type: none"> <li>a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of 5 sheets, as follows:           <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</li> <li><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</li> </ul> </li> <li>b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)), containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</li> </ul>		
<p>4. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Box No. I Basis of the opinion</li> <li><input type="checkbox"/> Box No. II Priority</li> <li><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li><input type="checkbox"/> Box No. IV Lack of unity of invention</li> <li><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li><input type="checkbox"/> Box No. VI Certain documents cited</li> <li><input type="checkbox"/> Box No. VII Certain defects in the international application</li> <li><input type="checkbox"/> Box No. VIII Certain observations on the international application</li> </ul>		
Date of submission of the demand 24.02.2005	Date of completion of this report 07.09.2005	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Moreno-Solana, S-F  Telephone No. +49 89 2399-7678	



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**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
  - This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
    - international search (under Rules 12.3 and 23.1(b))
    - publication of the international application (under Rule 12.4)
    - international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

**Description, Pages**

1, 4-8	as originally filed
2, 3, 3a	received on 18.07.2005 with letter of 15.07.2005

**Claims, Numbers**

1-13	received on 18.07.2005 with letter of 15.07.2005
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**Drawings, Sheets**

1/3-3/3	as originally filed
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a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3.  The amendments have resulted in the cancellation of:
  - the description, pages
  - the claims, Nos. 14
  - the drawings, sheets/figs
  - the sequence listing (*specify*):
  - any table(s) related to sequence listing (*specify*):

4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- the description, pages
- the claims, Nos.
- the drawings, sheets/figs
- the sequence listing (*specify*):
- any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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**1. Statement**

Novelty (N)	Yes:	Claims	1-13
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-13
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-13
	No:	Claims	

**2. Citations and explanations (Rule 70.7):**

**see separate sheet**

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**V. Citations and explanations:**

1. Reference is made to the following documents:

D1: EP-A-1 309 213 (cited by the Applicant)

D2: WO 01/26397 A1

D3: NORTEL NETWORKS/ SAMSUNG: "MBMS Scenarios - UE Link Handling"

3GPP TSG-RAN2-RAN3 35 MEETING, [Online] no. r2-030732/r3-030483, 3

April 2003 (2003-04-03), pages 1-7, XP002292826 INTERNET - SEOUL,

KOREA, 7TH-11TH APRIL, 2003 Retrieved from the Internet:

URL:[http://www.3gpp.org/ftp/tsg\\_ran/WG2\\_RL\\_2/TSGR2\\_35/Docs/](http://www.3gpp.org/ftp/tsg_ran/WG2_RL_2/TSGR2_35/Docs/)> [retrieved on 2004-08-17]

D4: PHILIPS: "on the issue of switching between p2p- and p2m- channels in MBMS"  
JOINT 3GPP TSG RAN WG2 AND WG3 ON MBMS, [Online] no. r2-030078, 13  
January 2003 (2003-01-13), pages 1-3, XP002292829 INTERNET - LONDON,  
UK, 15TH-16TH JANUARY 2003 Retrieved from the Internet:

URL:[www.3gpp.org/ftp/tsg\\_ran/WG2\\_RL2/TSGR2\\_AHs/2003\\_01\\_MBMS/Docs/](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_AHs/2003_01_MBMS/Docs/)> [retrieved on 2004-08-17]

2. The present invention relates to a **method of operating a multimedia broadcast/multicast service** according to the features of independent **claim 1**.
3. **Generally**, in order to provide the same data from a single source entity to a group of users (i.e. Mobile Stations) in a specific area (e.g. a cell controlled by a BTS), a Multimedia Broadcast/ Multicast Service (MBMS) is implemented.

When using MBMS, all MSs in a certain area (e.g. a cell) may receive the same data in a common channel (i.e. a channel which uses a point-to-multipoint ptm bearer).

Document D1 discloses a method for providing an MBMS service to a user, wherein an area is defined in which said service is available (e.g. a broadcast or multicast area), and it is determined whether a plurality of users are in said area or not. The

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users inside said area are arranged to receive the information concerning the MBMS service in a common channel, and the users outside said area are provided with the option of receiving said information via a dedicated channel (i.e. a channel using a point-to-point bearer), or even to not receive the service.

Document **D2** discloses a method of broadcasting/multicasting data to a group of mobile terminals. From statistical data indicating the optimal signal quality that the users normally experience when operating in a certain cell, a minimum transmission quality is established before making a decision on carrying out a broadcast/multicast to a group of users.

Document **D3** describes a mechanism for the implementation of MBMS services in a cell focused on the efficient use of radio resources, wherein an appropriate distribution of ptm or ptp bearers is determined based on the number of user equipments (UEs) interested in receiving an MBMS service in a certain cell.

Document **D4** deals with the decision of allocating ptm or ptm bearers for an MBMS service according to the radio conditions and number of users (UEs).

4. A **problem** arises when determining the use of ptm or ptp bearers for the implementation of an MBMS service for a plurality of mobile stations (MSs) in one or more predetermined areas of a cell in order to enhance the quality of the reception at the mobile stations.
  
5. The present invention overcomes said problem by providing a **method of operating a multimedia broadcast/ multicast service** according to the features of independent **claim 1**.

According to the **special technical features of the invention**, a method of operating a multimedia broadcast/ multicast service is provided, for which an offer of service is sent by a network controller to the mobile stations in a cell requesting a feedback on the interest of said users (mobile stations) on said service. Data related to each

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interested MS, that enables the determination of its position or received signal quality, is received, and a preferred distribution of ptm and ptp bearers for interested MSs in one or more predefined areas within said cell is calculated, wherein the range of a subsequent broadcast (which uses point to multipoint bearers) is determined by one of received power level or received quality at a mobile station of a notification message sent from a base transceiver station to said mobile station, and wherein each interested mobile station which is out of range of the subsequent broadcast transmission is required to use ptp bearers to receive said service.

The preferred distribution on ptp and ptm bearers is not determined according to the total number of MSs in a cell (which may or may not be interested on a certain service). On the contrary, just the set of "interested users" is taken out and from said set a preferred distribution is calculated according to received power level or quality of a notification message received at the mobile stations.

6. The present invention provides the **technical effect of improving the bearer selection (i.e. point-to-point or point-to-multipoint basis) for an MBMS service for which a plurality of users in a cell are interested, taking into account the received power level or received quality of a notification message at a set of interested mobile stations.**
7. The subject-matter of the present invention as claimed in independent claim 1, is neither disclosed in, nor rendered obvious by the **remaining prior art documents** cited in the international search report, since said documents, which merely relate to general state of the field of Multimedia Broadcast/Multicast Service and related mechanisms for the appropriate selection of a ptp or ptm basis for the implementation of said MBMS service, do **not** describe the method according to the particular feature combination of the present invention or part thereof as defined in said independent claim 1.
8. The subject-matter of claim 1 therefore is considered to be **new and to involve an inventive step**, Articles 33(2) and 33(3) PCT respectively.

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9. Since **claims 2-13** are dependent on independent claim 1, said claims **do also meet the requirements** of Article 33(2) and 33(3) PCT.
10. The present invention is **susceptible of industrial application**, Article 33(4) PCT.

allows any subscriber outside the area who has elected to still receive the multicast data to also get a ptp link for their data.

WO01/26397 describes determining a minimum transmission quality for a multicast broadcast, sending a test transmission to a group and receiving a response

5 from one mobile terminal representing the group, then broadcasting to the group if the test transmission exceeded the minimum quality.

3GPP TSG-RAN2/RAN3 #35 Meeting Seoul, Korea 7<sup>th</sup> to 11<sup>th</sup> April, 2003 describes a mechanism for determining whether an interested UE is in a multicast area or not and whether data distribution should be by point to point or point to multipoint

10 according to the number of interested UE's in each cell.

In accordance with the present invention, a method of operating a multi-media broadcast/multicast service MBMS comprises causing a network controller to broadcast to all mobile stations in a cell an offer of service; requesting from each mobile station an indication of interest in the offered service; receiving data relating to each interested

15 mobile station enabling the position or received signal quality of each mobile station within the cell to be determined; calculating a preferred distribution of point to multipoint and point to point bearers for interested mobile stations in one or more predefined areas within the cell; wherein the range of a subsequent broadcast is determined by one of received power level or received quality at the mobile station of a

20 notification message sent from a base transceiver station to the mobile station; wherein the broadcast uses point to multipoint bearers; and requiring each interested mobile station which is out of range of the subsequent broadcast transmission to use point to point bearers to receive the service.

Preferably, the method further comprises broadcasting at reduced power to the

25 mobiles within range.

Alternatively, the method further comprises broadcasting at an increased or decreased coding rate to the mobiles within range.

Although a typical broadcast service, such as MBMS, does not guarantee delivery, in order to maximise the number of users which receive the service

30 successfully, preferably, the method further comprises repeating the broadcast a number of times.

There are a number of methods by which the network controller can obtain the required data, for example the network controller may broadcast an offer of service using an MBMS channel and the mobile stations may respond using an existing random access channel (RACH), but preferably the network controller broadcasts an offer of service using an MBMS channel and the mobile stations respond using a new MBMS RACH.

The RACH is always present in a cell, but has very little free capacity; PRACH is not always deployed, but it has sufficient capacity and is already part of the standard; an MBMS specific RACH (MRACH) has the advantage that it has no legacy coding because it is new, but it would only be useful if included in the standard.

Preferably, both position and received signal quality data are received from each interested mobile station.

This may be, for example, data relating to distance from the BTS antenna, pathloss measurements or power used to respond to the network controller.

The mobile stations may use real-time measures of the position and power level data to decide whether they should request a point to point channel or a broadcast, but this could have the effect of changing the number from those calculated when making the determination and possibly increase the cost, so preferably, the network controller broadcasts the determined received power level or received quality for a broadcast and each interested mobile station tests against stored received power level or stored received quality to calculate whether it requires a point to point channel.

Preferably, data enabling the position or received signal quality to be determined for any mobile station which is not idle is transferred, from a network controller via which that mobile station is connected, to the network controller broadcasting the offer of service.

Typically, the service is universal mobile telecommunications service UMTS service and the data is transferred from a serving radio network controller RNC to a drift RNC via an interface link.

The interface could be Iur, Iur-g, Iu or interfaces to other access technologies. Preferably, the data is added to a linking message.

Alternatively, the data is transferred on demand.

Preferably, a change between a broadcast transmission and an alternative mechanism is made in accordance with a hysteresis diagram.

3a

This avoids a "ping-pong" effect whereby switching from one transmission mode to another occurs too frequently.

A method of operating a mobile wireless service in accordance with the present invention will now be described with reference to the accompanying drawings in which:

Figure 1 shows an example cell layout having three zones around a transceiver for which the method of the present invention can be applied;

Figure 2 illustrates an MRACH logical channel for the mobile station to use in its response in the method of the present invention; and,

Figure 3 outlines an example of the method of the present invention.

Figure 4 is a hysteresis diagram for change of mode between "point to point" and "point to multipoint".

CLAIMS

1. A method of operating a multimedia broadcast / multicast service, the method comprising causing a network controller (X) to broadcast to all mobile stations in a cell (A, B, C) an offer of service; requesting (1) from each mobile station an indication of interest in the offered service; receiving data (2) relating to each interested mobile station enabling the position or received signal quality of each mobile station within the cell to be determined; calculating a preferred distribution of point to multipoint and point to point bearers for interested mobile stations in one or more predefined areas within the cell; wherein the range of a subsequent broadcast is determined by one of received power level or received quality at the mobile station of a notification message sent from the base transceiver station to the mobile station; wherein the broadcast uses point to multipoint bearers; and requiring each interested mobile station which is out of range (B, C) of the subsequent broadcast transmission (6) to use point to point bearers (7) to receive the service.
2. A method according to claim 1, further comprising broadcasting at reduced power to the mobiles within range (A).
3. A method according to claim 1, further comprising broadcasting at an increased or decreased coding rate to the mobiles within range (A).
4. A method according to claim 3, further comprising repeating the broadcast a number of times.
5. A method according to any preceding claim, wherein the network controller (X) broadcasts an offer of service using an MBMS channel and the mobile stations respond using an existing random access channel RACH.
6. A method according to any of claims 1 to 4, wherein the network controller (X) broadcasts an offer of service using an MBMS channel and the mobile stations respond using a new MBMS RACH.

7. A method according to any preceding claim, wherein both position and received signal quality data are received from each interested mobile station.

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8. A method according to any preceding claim, wherein the network controller (X) broadcasts the determined received power level or received quality for a broadcast and each interested mobile station tests these against stored received power level or stored received quality to calculate whether it requires a point to point channel.

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9. A method according to any preceding claim, wherein data enabling the position or received signal quality to be determined for any mobile station which is not idle is transferred, from a network controller (X) via which that mobile station is connected, to the network controller broadcasting the offer of service.

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10. A method according to claim 9, wherein the service is universal mobile telecommunications service UMTS and the data is transferred from a serving radio network controller RNC to a drift RNC via an interface link.

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11. A method according to claim 10, wherein the data is added to a linking message.

12. A method according to claim 10, wherein the data is transferred on demand.

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13. A method according to any preceding claim, wherein a change between a broadcast transmission and a point to point bearer is made in accordance with a hysteresis diagram.